# Safe and Sustainable Arctic Shipping Management and Development





Mawuli Afenyo Adolf K.Y. Ng Naima Saeed

## SAFE AND SUSTAINABLE ARCTIC SHIPPING MANAGEMENT AND DEVELOPMENT

This page intentionally left blank

## SAFE AND SUSTAINABLE ARCTIC SHIPPING MANAGEMENT AND DEVELOPMENT

### **MAWULI AFENYO**

Department of Maritime Business, Texas A&M University, Galveston, TX, United States

## ADOLF K.Y. NG

Faculty of Business and Management, BNU-HKBU United International College, Zhuhai, Guangdong Province, China

## NAIMA SAEED

School of Business and Law, University of Agder, Kristiansand, Norway



#### Elsevier

Radarweg 29, PO Box 211, 1000 AE Amsterdam, Netherlands 125 London Wall, London EC2Y 5AS, United Kingdom 50 Hampshire Street, 5th Floor, Cambridge, MA 02139, United States

Copyright  $\bigcirc$  2024 Elsevier Inc. All rights are reserved, including those for text and data mining, Al training, and similar technologies.

Publisher's note: Elsevier takes a neutral position with respect to territorial disputes or jurisdictional claims in its published content, including in maps and institutional affiliations.

No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or any information storage and retrieval system, without permission in writing from the publisher. Details on how to seek permission, further information about the Publisher's permissions policies and our arrangements with organizations such as the Copyright Clearance Center and the Copyright Licensing Agency, can be found at our website: www.elsevier.com/permissions.

This book and the individual contributions contained in it are protected under copyright by the Publisher (other than as may be noted herein).

#### Notices

Knowledge and best practice in this field are constantly changing. As new research and experience broaden our understanding, changes in research methods, professional practices, or medical treatment may become necessary.

Practitioners and researchers must always rely on their own experience and knowledge in evaluating and using any information, methods, compounds, or experiments described herein. In using such information or methods they should be mindful of their own safety and the safety of others, including parties for whom they have a professional responsibility.

To the fullest extent of the law, neither the Publisher nor the authors, contributors, or editors, assume any liability for any injury and/or damage to persons or property as a matter of products liability, negligence or otherwise, or from any use or operation of any methods, products, instructions, or ideas contained in the material herein.

#### ISBN: 978-0-443-18849-7

For information on all Elsevier publications visit our website at https://www.elsevier.com/books-and-journals

Publisher: Mica H Haley Acquisitions Editor: Kathryn Eryilmaz Editorial Project Manager: Debarati Roy Production Project Manager: Gomathi Sugumar Cover Designer: Vicky Pearson Esser

Typeset by STRAIVE, India



Working together to grow libraries in developing countries

www.elsevier.com • www.bookaid.org

## Dedication

For Dr. David G. Barber Pearls are everywhere but not the same as the eyes Thank you. This page intentionally left blank

## Contents

Photo collection	xi
About the authors	xix
Preface	xxiii

## Section A Theoretical settings

1.	Setting the scene	1
	1. Introduction	3
	2. Chapter layouts	5
	3. Previously published materials	8
	References	9
2.	Arctic shipping development and management:	
	A holistic view	11
	1. Definition of the Arctic	11
	2. The Arctic Council	13
	3. Management and development of the Arctic: The cases	
	of selected countries	14
	4. China and the Arctic	27
	5. Business and environmental management view of the Arctic	28
	6. Conclusions	29
	References	30
3.	Arctic policies, governance, and cooperation: A catalyst for the	
	development and management of the Arctic	33
	1. Introduction	33
	2. Selected Arctic countries policy	33
	3. Selected non-Arctic countries policy	36
	4. Policy similarities	38
	5. The Polar Code	41
	6. The Barents Euro-Arctic transport plan	42

7. Discussions and conclusions	
References	

43 44

### Section B Economic opportunities and risks

	Potential consequences of Arctic shipping and resource exploitation	47
	1. Introduction	47
	2. Discussions	55
	3. Conclusions	56
	References	57
5.	Operational risks of Arctic shipping	59
	1. Introduction	59
	2. Operational risk factors in the Arctic	61
	3. Polar Code and its role in risk management	63
	4. The Bayesian Network as a tool for assessing the operational risk	
	of arctic shipping	65
	5. Methodology	66
	6. Discussions	68
	7. Conclusions	71
	References	71

## Section C Operational challenges of Arctic shipping

6.	Arctic oil spills: Should we be worried?	75
	1. Introduction	75
	2. Fate and transport processes of oil	77
	3. Response to oil spills	79
	4. Policies regulating oil spills	81
	5. Discussions	82
	6. Conclusions	83
	References	84
7.	Arctic shipping insurance	87
	1. Introduction	87
	2. Literature reviews	89
	3. Methodology	90
	4. An overview of industry experience in Arctic	
	shipping insurance	93
	5. Analysis of case study with the proposed model	97
	6. Analysis of the case	97

	7. Results and discussions	102
	8. Conclusion	102
	Acknowledgment	105
	References	105
8.	Evaluation of Arctic resources exploration, management,	
	and supply chains	107
	1. Introduction	107
	<ol> <li>A link between the resource exploration trends and shipping needs</li> <li>The role of third-party services in supporting resource exploration</li> </ol>	108
	and shipping in the Arctic	111
	4. The resupply of tourism in the Arctic during COVID-19	113
	5. The risk of the Arctic supply chain disruption	115
	6. Conclusion	117
	References	118
Sec	ction D Environmental and social impacts of Arctic shipping	
9.	Environmental and socio-economic implications of Arctic	
	development	123
	1. Introduction	123
	2. Environmental impacts	124
	3. Assessing the social impacts	130
	4. Discussions	133
	5. Conclusion	134
	References	134
10.	Indigenous knowledge and culture: How important	
	is it for Arctic development?	137
	1. Introduction	137
	<ol> <li>Indigenous knowledge and culture in Arctic development</li> </ol>	138
	3. Conclusion	148
	References	150
11.	•	
	and research	151
	1. Introduction	151
	2. The Amundsen expedition	152
	3. The CCAPTIA conference	153

	4. Discussions	157
	5. Conclusion	159
	References	160
12.	Cybersecurity in the Arctic: Are businesses and infrastructures safe?	161
	1. Introduction	161
	2. Arctic cybersecurity and business operations	163
	3. Data and Arctic maritime cybersecurity	166
	4. Risk, insurance, and Arctic maritime cybersecurity	166
	5. Discussions	169
	6. Conclusion	169
	References	170
Index	X	173